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TABLE OF CONTENTS.

PAGE.
Editorial 325
Brazil's Enormous Rubber Resources.................. 326
Evolution of Rubber................................. 327
Division of Animal Industry—
Report of Veterinarian 328
Report of Assistant Veterinarian.............. 331
Division of Entomology 336
Division of Forestry—
Report of Forest Nurseryman................... 338
Report on Arbor Day........................... 339
Artificial Cross Fertilization of the Mango........ 340
Cotton Growing in Argentina......................... 343
Problems of Economic Importance Regarding Plant Diseases 344
A Sugar Cane Pest in St. Croix...................... 347
Robusta Coffee 348

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from $1.00 to $2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 207., Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 207 HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

THE HAWAIIAN

FORESTER & AGRICULTURIST

VOL. IX. NOVEMBER, 1912. No. 11.

Our plant pathologists may be interested in an article in this number, containing a synopsis of an address by Professor Salmon to the British Mycological Society last year on problems of economic importance regarding plant diseases.

A bulletin on citrus scab has been received from the University of Florida experiment station. It is by H. S. Fawcett, and in a table of references quotes J. E. Higgins in a bulletin of the Hawaii experiment station issued in 1905. The Florida bulletin gives three modes of prevention—1, destroying all sour orange or other worthless growth; 2, spraying when necessary; 3, cutting out scabby growths.

Intelligence of vast importance to the future of the American raw cotton industry is contained in an article in this number on cotton-growing in Argentina. That country is there said to have as large an area adapted to cotton-growing as the United States. Although the Argentina industry is now handicapped for lack of labor, an enormous Spanish immigration, together with the exploitation of a Barcelona syndicate, may tell a different story in the not distant future.

There will surely be no question about the extension of bovine tuberculosis control work to the islands other than Oahu, either through action by the incoming boards of supervisors for the different counties, or, if this should be impracticable for lack of revenue, by the legislature in measures to provide either the county boards or the board of agriculture with the requisite funds for the campaign. It will not do to compel the municipality of Honolulu to rest under the menace of infection from outside after having its herds made clean through the combined measures of the board of supervisors and the board of agriculture.

That strange disease reported as existing among horses in Waipio Valley, mentioned by Dr. Norgaard in his monthly report in this number, has proved to be a recrudescence of the glanders epidemic of several years ago. This the Territorial veterinarian ascertained on personal investigation on the ground, and on his return President Giffard despatched him back with instructions to carry out his recommendation of a quarantine of the district along with a roundup of all the stock. This action was approved and ratified by the board at its monthly meeting.

BRAZIL'S ENORMOUS RUBBER RESOURCES.

An article on the wild rubber trees of Brazil in the Bulletin of the Bureau of Agricultural Intelligence and Plant Diseases contains facts that might well strike dismay into the developers of rubber in other countries, were it not for the saving clause, so to speak, of the inaccessibility of the vast resources of the wild article for marketing—a condition that is not likely to be overcome in the near future, or until the rapidly growing demand for rubber will call for the prodigious reserves of the Brazilian forests. The article says in part:

"The world's consumption of rubber is calculated by M. A. Dubosc as being, for 1911, 85,000 tons, with a co-efficient of increase of 8% per annum, which would raise the total world's consumption to 180,000 tons about 1920, and the business turnover calculated by Sir H. Blake at 1,100 million per year, would attain to more than 2½ thousand million francs.

"Of the whole of this enormous consumption, the greatest part is supplied by Brazil with its wild rubber, Para, which also ranks highest in point of quality. In 1910 Brazil is said to have produced 38,000 tons of Para, that is, one-half of the world's consumption.

"Each great producing region appears to have its special rubber plant. In Brazil the area of Amazonas, which is the principal producing centre, amounts to nearly 6½ million sq. kilometers (2,509,000 sq. miles) i. e., 12 times the area of France. In all parts of this state there are found one or another of the varieties of *Hevea* or *Castilloa* but especially that wonderful tree, *Hevea Braziliensis,* which, with well-conducted tappings can when mature, at about 35 years, yield up to 12 kgs. (25.4 lbs.) of rubber. The number of trees standing in the two States of Para and Amazonas is estimated at 200 million. In the State of Amazonas, the field of working of the natural 'seringaes' (rubber estates) is growing day by day, in consequence of exploration being carried to the very remotest ramifications of the great rivers, which are the confluents of the Amazon; unfortunately the impossibility, almost, of transport make the cost price unremunerative. Still the reserves of rubber ripe for tapping in the Amazonian region are not limited to the great number of *Hevea Braziliensis* forming the principal wealth of that country. They are also formed by other natural rubber bearing species of appreciable value, at least equal to that of some famous plants of other countries."

EVOLUTION OF RUBBER.

An article on rubber expositions as a trade stimulus, by Sir Henry A. Blake in the *India Rubber World,* contains the following passages, the remarks about rubber for roadmaking being of universal interest:

"During the exhibition it became known that an international exhibition on somewhat similar lines was projected for New York, and now that the project has materialized, further progress will doubtless be made in the solution of many problems with which rubber planters and manufacturers have still to deal. Great as is the production in sight, the horizon of demand is ever widening. One hundred and forty years ago, its only known practical use was as an eraser of pencil marks. Today it ministers to the wants of the infant in his cradle, as well as to the comfort of the aged, while in one form or another it enters with frequency into the countless demands of civilization.

"Among the exhibits at the Agricultural Hall, there was one that promised important developments. This was a section of rubber prepared for roadwork but not yet fulfilling all the necessary conditions that would enable it to compete with the quarry and the forest for the preparation of road surfaces for heavy traffic. That this difficulty will be overcome, there can be no doubt, and when it has been, any possible doubt of a limitless demand will vanish like a moving mist. Silent streets with the cessation of the turmoil and roar of traffic, would in relief of brain fag to the busy worker, be the most potent factor for health and strength ever offered to the business men and women of great cities, while imperviousness to water would obliterate dust and mud, carry off equally heavy rains or melting snows and save the endless labor on frost upheavals every spring that try the equanimity of dwellers in New York.

"There is a giant in the path whose name is 'skid,' but Jack the Giant Killer will emerge from some busy inventive brain and demolish the skid by a non-slip grip surface that will withstand wear and tear and secure safety in all weathers in horse or motor. From which side of the Atlantic will he emerge? There's the rub!"

The *Cuba Review* for September, 1912, gives a table which shows that the chief exports of fruit and fruit products from Porto Rico to the United States during 1912 were valued as follows: Grape fruit, $524,976; oranges, $584,368; pineapples, $683,801; lemons, $3,131; limes, $960; canned pineapples, $258,671. Shipments of honey to the value of $42,251 were also sent.

DIVISION OF ANIMAL INDUSTRY.

Honolulu, Oct. 29, 1912.

Hon. W. M. Giffard, President and Executive Officer, and Members of the Board of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I beg to report on the work of the Division of Animal Industry for the month of October, 1912, as follows:

Animal Quarantine.

Pursuant to instructions received by the President of this Board after the last monthly meeting, in regard to the admission of performing animals subject to quarantine under the rules and regulations of the Board, a circular letter, dated October 22, 1912, was sent to all theatres and amusement agencies in Honolulu informing them as per the appended copy, that henceforth all such animals would have to undergo the regular quarantine, the same as other animals for whatever purpose imported.

A few days before this letter was sent out there arrived in Honolulu three performing Shetland ponies which, at a special meeting of the Committee on Animal Industry, were allowed to be quarantined in a shed provided for the purpose at the rear of the Liberty Theatre. The quarantine on these animals will expire on October 29, 1912, and there will consequently be no cause for action of the Board on an application for permission to exhibit the ponies at Kahului and Hilo, and the agents have been so informed.

With the receipt of General Macomb's acknowledgment of the letter informing him that no further special permit to quarantine dogs belonging to the military authorities outside of the Territorial Animal Quarantine Station would be granted, this subject may be considered as definitely disposed of.

Honolulu Quarantine Station.

For the display of the rules governing the actions of visitors and owners of quarantined animals, as approved by the Board, a glass fronted case has been ordered and will be placed at the main entrance to the station. Below this case a push button, connecting with an electric bell, will be placed, so that the keeper may be summoned to admit visitors and others calling on business outside the regular visiting hours. During these hours, 10:00 to 12:00 a. m. and 2:00 to 4:00 p. m., the main entrance will be kept open and the keeper be in attendance, while at all other times the station will remain closed except for the admission or discharge of animals, so that the keeper may give his full time to the care and keep of the station and the animals.

Hilo Quarantine Station.

The surveyed plan of the site of the Hilo Quarantine Station was received from Messrs. T. H. Davies & Company during the past month, and in accordance with instructions received, a rearrangement of the enclosures, chutes and feed-rooms, as planned in the original blue print, has been effected. A copy of the same has been sent to the Deputy Territorial Veterinarian at Hilo for his approval or for such alterations as he may wish to suggest after examining the general topography and surface of the new site. When returned to this Board the final plans and specifications will be prepared and tenders advertised for.

Kahului Quarantine Station.

During the past month the chairman of the Committee on Animal Industry visited Kahului, Maui, and selected a piece of land which Messrs. Alexander & Baldwin had been good enough to offer to transfer to this Board for a nominal consideration, for the purpose of the establishment of an animal quarantine station for the island of Maui. Messrs. Alexander & Baldwin have promised to have this piece of land surveyed, and when a plan of same is received a sketch of pens, chutes and enclosures will be made so as to come within the allotted appropriation of $1,000.00 set aside by the Board for this purpose.

Attempted Illegal Importation of Dog.

In regard to this subject, it appears that owing to the indisposition of the County Attorney, it has been impossible for the Attorney General to take any further steps in regard to the prosecution of Mr. Brasch for attempting to import a dog in circumvention of the regulations of this Board. The steamship "Ventura" will return to this port from Australia on November 1, 1912, when it is the Attorney General's intention to prosecute the master of that vessel in connection with the same case.

Tuberculosis Control Work.

According to instructions received from the President of this Board, a letter was addressed to the deputy Territorial veterinarians at Hilo, Kahului and Lihue, requesting them to take the necessary steps to ascertain in how far it would be advisable or feasible to extend the tuberculosis control work to the Islands outside of Oahu, at the present time. The respective answers to these letters are herewith appended, and while there seems to be a certain desire to have all dairy animals tested for tuberculosis, it appears to be a question whether so important a subject should be presented for action by the respective Boards of Supervisors at such a late time in their incumbency of office. To assume the responsibility for the promulgation of an ordinance requiring the testing of all dairy cattle and the destruction of all animals found to be affected with tuberculosis, by these various boards just before a majority of their members may be retiring from office can hardly be expected of them, and as some time will be required for the further education of both dairy owners and milk consumers to thoroughly understand the importance of this measure, it may be better not to force an issue at the present time, but rather to get prepared to present a uniform milk ordinance for the approval of the respective new Boards of Supervisors as soon as possible after they have become established in office.

About twenty head of cattle have been tested during the month, most of them dairy animals being bought or sold or transferred from stable to stable, out of which number three animals have reacted; at the same time the assistant Territorial veterinarian has given considerable time to the testing and examination of milk samples as collected by the municipal milk inspector. Dr. Case's report shows that while there is an improvement over the conditions reported on last month, there is still room for a considerable reduction in the number of micro-organisms found in most of the samples.

Epidemic Among Horses on Hawaii.

On the 28th inst. a message was received from Messrs. Schaefer & Company informing the Board that an outbreak of an unknown disease had occurred among the horses in Waipio Valley on Hawaii and that six (6) head had died, requesting that the Territorial Veterinarian be asked to investigate. Four years ago an epidemic of glanders occurred in Waipio Valley, resulting in the loss of more than twenty (20) horses, but judging from the information available it did not seem likely that the present disease could be glanders, and the Territorial Veterinarian has consequently been instructed to make an investigation immediately. In order to prevent the further spread of the disease a wireless message addressed to the manager of the Kukuihaele Plantation Company was forwarded immediately instructing him to place Waipio Valley in quarantine, that is, not to allow any sick or suspicious animals to leave the valley, but to hold the same for examination by the Territorial Veterinarian upon his arrival there. As soon as the true nature of the disease has been ascertained I shall report to the Board, and expect to return from Hawaii within a week or ten days.

Very respectfully,

VICTOR A. NORGAARD,
Territorial Veterinarian.

REPORT OF ASSISTANT VETERINARIAN.

Honolulu, Oct. 31, 1912.

Dr. V. A. Norgaard, Chief of Division of Animal Industry,
Bureau of Agriculture and Forestry, Honolulu, T. H.

Sir:—I beg to submit herewith a report for the month of October:

Tuberculosis Control.

The following animals were subjected to the intra-dermal test:

		T.	P.	C.
October	7-10—Mrs. Andrews	1	1	0
"	9-12—Bernal Live Stock Co.	12	10	2
"	10-12—A. Waterhouse	5	5	0
"	16-19—F. C. Atherton	1	0	1
		19	16	3

Although the number examined is small it contains points of considerable interest. The animals tested for the Bernal Live Stock Company came from Kona and were purchased from the Gouveira Ranch, which supplies different dairies on this island with a good many milch cows. Out of two hundred (200) head of cattle arriving here from Kona ten (10) have been condemned on the test which, if this can be taken as any criterion, would show 5% of tuberculosis among the dairy animals in Kona, Hawaii. This further means that with every hundred head of cattle shipped in here from Kona there are five tuberculous animals to become centers of infection.

This clearly demonstrates the value of eternal vigilance in the campaign against tuberculosis and the great value of a milk ordinance, such as we have, which requires that every dairy supplying milk for human consumption must be composed of animals free from tuberculosis, in other words animals which have successfully passed the tuberculin test.

By keeping careful watch over the dairies we have been able to eliminate ten centers of infection which have been imported directly from the island of Hawaii. Had these ten animals gone untested they would have rapidly spread the disease either directly or indirectly to every dairy on the island of Oahu, and the labor of years would have been lost and conditions would have rapidly reverted to what they were when systematic testing was first established.

Dairy stock shipped from the other islands are purchased by dairymen here subject to the test so the condemnation of these animals entails no loss to them as other animals are sent to take their places. It has been the natural tendency on the part of the dairymen to send the condemned animals back, but to allow this would only be to continue the disease and help its spread. Refusing permission to return them and compelling the dairymen under the ordinance to remove them from their dairies has forced these tuberculous animals to the slaughter-house and they have been removed once and for all from endangering human life and from spreading the disease to other dairies.

This forcibly brings to our attention the absolute necessity of continuing the test to the other islands. It is evident that this must be our plan of campaign if we hope to keep the milk supply of the City and County of Honolulu uncontaminated and eventually eradicate tuberculosis from these islands.

On October 16th to 19th I tested and condemned a cow for Mr. F. C. Atherton. The history of this cow, as far as our records show, is interesting and points out the danger of having in the herd or on the premises any untested animal and also the necessity of inquiring into the condition of the animals in a pasture before allowing other animals to go into it.

The cow in question was first owned by Mr. T. H. Cummins and while in his possession successfully passed the tuberculin test on May 25, 1910, and also on February 21, 1911, and was sold to Mr. Atherton on January 23, 1912. At the time of purchase Mr. Atherton had on his premises an untested cow which had been in his possession for about five years and which had recently returned from Chas. Bellina's pasture at Niu, where it had been for some time.

On the first general test quite a number of condemned animals from Mr. Isenberg's herd were sold to Mr. Bellina for a nominal sum and placed by him in this pasture at Niu for the purpose of fattening before sending them to slaughter. These animals either directly or indirectly passed the infection to Mr. Atherton's cow, which then returned to his dairy and was placed with the newly purchased animal.

On March 1st I was called upon to test these two animals. The one which had recently returned from Niu gave a large typical reaction and was condemned and branded. Post-mortem revealed a case of well advanced generalized tuberculosis and the entire carcass was condemned at the slaughter house. The newly purchased cow successfully passed the test.

What significance can be attached to the fact that this animal, which had been in immediate contact with the diseased one for a period of over a month, passed the test. To one who is acquainted with the course of the disease in the animal system, and the paths through which the organism is eliminated and subsequent infection occurs this does not mean that the animal is not infected, for the chances are a hundred to one of its being so, but that the disease is in the period of incubation, that is, multiplication of the organisms had not reached a stage sufficient for the production of lesions in the animal tissue. That the cow would react at a later date was almost a certainty.

Such being the circumstances Mr. Atherton was advised to have the cow retested at a later date, consequently on October 16th I was called upon to again test this animal. Upon this test she gave a large typical reaction and was condemned and branded. After careful post-mortem at the slaughter-house Dr. Monsarrat reported that he was unable to find any lesions of tuberculosis. This cannot be considered as meaning that there was an entire absence of disease, but rather that the lesions were so small and so few as to readily escape detection. It is very easy to overlook a few small nodules in the substance of the large lung of a cow or one or two small nodules in one of the numerous lymphatic glands of the body, and one rapidly progressing lesion is enough to cause a reaction to the test and reveal the presence of disease.

I think we can safely say from the results of the post-mortem examination that this cow was not a danger to public health at this stage of the disease, but who can say when she would become dangerous, who can say when she would begin to pass tubercule bacteria in her milk and feces. I think that in a few months more she would have become a real live danger to her owner and to any animal with which she might become associated.

This brings us to the question: what relation does the size of the swelling in a reaction bear to the disease in the animal system as demonstrated by post-mortem examination? It has been demonstrated repeatedly by post-mortem examination that the size of the reaction bears no direct relation to the amount of the disease. That it has some important relations to the disease is apparent. After much thought upon the subject and many post-mortems I have reached the conclusion that while the size of the swelling has no direct relation to the *amount* of disease it has a *very close* relation to the progress and activity of the tubercle bacteria within the animal system. This will vary as will the size of the reaction vary as the resistance to the disease varies.

Bacteriological Examination of the Milk Supply.

During the last month twenty-five (25) samples of milk and cream from different dairies were analized for their bacterial content with the following results:

No. 1—Mixed milk from Andrade, Moanalua, Bellina and Salina dairies. Exam. after 72 hours inc. at 27° C. 229.160 bact. per cc.

No. 2—Same as above taken from purifying machine. Exam. after 72 hours inc. at 27° C. 1,500 bact. per cc.

No. 3—George Holt dairy. Exam. after 72 hours inc. at 27° C. 823.330 bact. per cc.

No. 4—Same as above after passing through the purifier. Exam. after 72 hours inc. at 27° C. 1330 bact. per cc.

No. 5—Cream after pasteurization at 150° F. for 10 m. Exam. after 72 hours inc. at 27° C. 273,330 bact. per cc.

No. 6—Waialae Ranch milk. Exam. at 72 hours inc. at 27° C. 396,000 bact. per cc.

No. 7—Jersey milk from Mrs. Isenberg's herd. Exam. after 72 hours inc. at 27° C. 65,000 bact. per cc.

No. 8—H. B. Brown dairy. Exam. after 72 hours inc. at 27° C. 119,160 bact. per cc.

No. 9—Cream after pasteurization at 150° F. for 10 m. Exam. after 72 hours inc. at 27° C. 100,000 bact. per cc.

No. 10—K. Inouye dairy. Exam. after 96 hours inc. at 27° C. 39,000 bact. per cc.

No. 11—S. Tsumoto dairy. Exam. after 96 hours inc. at 27° C. 876,660 bact. per cc.

No. 12—S. Hirata dairy. Exam. after 72 hours inc. at 27° C. 120,000 bact. per cc.

No. 13—F. Gouveira dairy. Exam. after 72 hours inc. at 27° C. 100,500 bact. per cc.

No. 14—T. F. Farm dairy. Exam. after 72 hours inc. at 27° C. 126,660 bact. per cc.

No. 15—J. M. Whitney dairy. Exam. after 72 hours inc. at 27° C. 50,000 bact. per cc.

No. 16—T. H. Cummins dairy. Exam. after 72 hours inc. at 27° C. 75,500 bact. per cc.

No. 17—W. E. Wall dairy. Exam. after 72 hours inc. at 27° C. 30,500 bact. per cc.

No. 18—Waialae Jersey milk (house) 5 hours old. Exam. after 72 hours inc. at 27° C. 30,330 bact. per cc.

No. 19—Waialae Jersey milk (barn) 5 hours old. Exam. after 72 hours inc. at 27° C. 70,000 bact. per cc.

No. 20—Waialae Ranch milk 5 hours old. Exam. after 72 hours inc. at 27° C. 383,750 bact. per cc.

No. 21—Cream after pasteurization at 150° F. for 10 m.; 24 hours old at 40° F. Exam. after 72 hours inc. at 27° C. 210,000 bact. per cc.

No. 22—George Holt dairy; 6 hours old; temp. 82° F. Exam. after 72 hours inc. at 27° C. 650,000 bact. per cc.

No. 23—T. F. Farm dairy, fresh from cooler. Exam. after 72 hours inc. at 27° C. 217,330 bact. per cc.

No. 24—T. F. Farm dairy, fresh cream. Exam. after 72 hours at 27° C. 3,190,000 bact. per cc.

No. 25—I. Nayaki dairy; 8 hours old on ice. Exam. after 72 hours inc. at 27° C. 1,322,000 bact. per cc.

There has been some improvement in the manner of handling the milk in the dairies during the last month, but there is still room for further improvement. Looking at samples Nos. 6 and 7, 18, 19 and 20 it is very evident that greater care is used in the handling of milk from Mrs. Isenberg's Jersey herd than is used in the production of milk from the ranch herd. So marked a difference should not be; as much care should be exercised in the production of milk from one dairy as the other. There seems to be a disposition on the part of the Dairymen's Association to accept milk no matter what its condition and from those who have not even a permit to sell milk. This is no doubt due to the confidence they have in their purifying apparatus and its demonstrated ability to considerably lower the bacterial content of milk subjected to its influence, but there is a higher principle involved. The position occupied by the Dairymen's Association in the system of milk supply of the city is such as enables it to exert a powerful influence toward the betterment of the product as it reaches them, and it should use this influence to encourage its many contributors to produce a clean produce in a sanitary way.

Samples Nos. 23, 24, 25 show counts far above what they should be and from one dairy in particular which has shown no improvement over last month. Advice and instructions have been given and the Municipal Milk Inspector is keeping close and careful watch of this dairy along with several others and material improvement may soon be expected.

Inspection Service.

The following is the list of inspected live stock admitted to the Territory through the port of Honolulu:

Oct. 1—S. S. Wilhelmina, San Francisco:
- 1 dog, Mrs. E. D. Tenney, quarantined.
- 5 cts. poultry.

Oct. 1—S. S. Workman, Liverpool, England—
- 3 bull dogs, Mr. J. W. Waldron. As they were accompanied by the proper certificates, and as England is one of the three countries regarded by us as free from rabies, they were allowed to enter the Territory without being subjected to a period of quarantine.

Oct. 9—S. S. Honolulan, San Francisco—
- 15 Hereford bulls, 1 Berkshire boar, Raymond Ranch.
- 2 Jersey bulls, 1 Jersey heifer, 3 German sheep dogs (quarantined), D. P. R. Isenberg.
- 1 Berkshire boar, W. F. X. Co.
- 5 crates poultry.

Oct. 10—S. S. Zealandia, Vancouver, B. C.—
- 1 dog (Pointer), Mr. J. B. Mercer, quarantined.

Oct. 14—S. S. Sierra, San Francisco, Cal—
- 3 ponies, 1 monkey, Leon Morris. The three ponies were show animals, and to facilitate their handling the Board allowed them to be quarantined at the Liberty Theatre.

Oct. 15—S. S. Hilonian, Seattle, Wash.—
- 2 horses, Honolulu Const. and Draying Co.

Oct. 15—S. S. China, Orient—
- 1 crate Japanese game chickens, Diamond K.

Oct. 16—S. S. Virginian, Tacoma, Wash.—
73 horses, Charles Bellina.
Oct. 28—S. S. Sonoma, San Francisco, Cal.—
3 crates chickens, W. F. X. Co.
Oct. 29—S. S. Chiyo Maru, Orient—
3 crates chickens, Diamond F.
Oct. 30—S. S. Wilhelmina, San Francisco, Cal.—
7 crates poultry.

Respectfully submitted,

LEONARD N CASE,
Assistant Territorial Veterinarian.

DIVISION OF ENTOMOLOGY.

Honolulu, October 31, 1912.

Hon. Board of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of October, as follows:

During the month there arrived 35 vessels, of which 18 carried vegetable matter and 1 vessel carried clean moulding sand. The usual careful inspection was made with the following results:

Disposal, with principal causes.	*Lots*	*Parcels*
Passed as free from pests	1184	28,470
Fumigated	46	149
Burned	16	861
Total inspected	1246	29,480

Rice Shipments.

During the month 21,544 bags of rice arrived from Japan, most of which consisted of new crop rice. All shipments were carefully inspected and released as free from pests.

Pests Intercepted.

During the month 48 packages of fruit and vegetables, including 2 packages of sugar cane, were taken from the baggage of the passengers and destroyed. The sugar cane consisted of ten pieces, 3 feet long. This was taken to the Lucas Mill and burned.

In the mail during the month we handled 92 packages of plants and seed. We found several packages of corn and peas infested with the *Augoumois grain moth* and the *pea weevil* and notified the shippers of these infested shipments.

Several passengers from Japan brought chestnuts which we found badly infested with weevils and larvae of a moth and these were first fumigated with carbon bisulphide and then destroyed by burning. While inspecting on the dock we found a single specimen of the Harlequin cabbage bug, *Murgantia histrionica,* crawling on merchandise cargo. I only mention this to show that it is very easy for insects to be transported from one country to another. This bug probably found its way from some cabbages on an adjacent dock in San Francisco and was brought in here unmolested in the ship's hold. Also, while walking on deck of the steamer "China" from the Orient, a common Dermested beetle, *Dermestes vulpinus,* flew onto my coat, from out of the hold of the vessel. This insect infests hides and is found around bone fertilizers, etc., and is cosmopolitan.

One hundred gardenia plants which arrived by freight on the steamer "Chiyo Maru," were badly infested by a *Lepsidopterous* borer, probably a *Tortrix* species. The larvae had girdled the young plants at the surface of the ground and also had made channels through the bark of the plants. Our preliminary fumigation with *Hydrocyanic* acid gas failed to kill them. We then fumigated them with *Carbon bisulphide* and burned up the entire shipment.

Hilo Inspection.

Brother M. Newell reports the arrival of 10 vessels—five steamers and five sailing vessels. The five steamers brought vegetable matter consisting of 154 lots and 2369 parcels. One package of plants was fumigated and fifty sacks of potatoes were overhauled before being released.

Inter-Island Inspection.

During the month of October 60 steamers were attended to and the following shipments were passed:

Plants	60	packages
Fruits	14	"
Lily Root	4	"
Taro	716	bags
Total	794	packages

inspected and passed.

The following packages were refused shipment:

Various fruits	40	packages
Plants infested and having too much soil	22	"
Vegetables	4	"
Total inspected and refused shipment	66	packages

Respectfully submitted,

E. M. Ehrhorn,
Superintendent of Entomology.

DIVISION OF FORESTRY.

REPORT OF FOREST NURSERYMAN.

Honolulu, Oct. 31, 1912.

Hon. W. M. Giffard, President and Executive Officer, Board of Agriculture and Forestry.

Dear Sir:—I herewith submit a report of the principal work done during the month of October, 1912.

Nursery—Distribution of Plants.

	In seed boxes.	In boxes transplanted	Pot grown	Total
Sold	500	50	406	956
Gratis	...	..	467	467
	500	50	873	1423

Collections on Account of Plants Sold.

The collections for the month on account of plants sold amounted to $10.05.

Arrangements are being made for the distribution of a large number of forest and flowering trees consisting of sixteen species for Arbor Day planting, November 8. Superintendent Pope of the Department of Public Instruction has sent copies of a circular letter to the principals of all the public schools of the Territory notifying them that trees for Arbor Day planting can be had free by applying at the Government Nursery in Honolulu and also at the two sub-nurseries on the other islands.

Advertisements notifying the general public of the offer of this Board to supply free trees for planting on that day are being published in all the leading newspapers in Honolulu and on the other islands, in the English, Hawaiian, Portuguese, Japanese and Chinese languages.

Plantation Companies and Other Corporations.

Under this head orders have been received for 5000 trees in transplant boxes ready to set out. Orders so far received to be delivered during the months from November, 1912, to February, 1913, reaches the total of 500,000 assorted trees in seed boxes and 17,000 in transplant boxes ready to set out. One hundred and forty thousand trees in seed boxes have been delivered during the month and 12,000 trees in transplant boxes and 60,000 in seed boxes will be delivered in November. The orders will all be filled in time for the season's planting.

Experiment Garden, Makiki.

The men at this station have been assisting in getting trees ready for Arbor Day and doing other routine work.

U. S. Experimental Planting, Nuuanu Valley.

The man employed for the purpose of attending to the trees has been hoeing and clearing away the grass from the young trees.

Now that the weather is getting more favorable for tree planting, we intend, after the Arbor Day rush is over, to plant more species and also to fill a few blanks in the planted part of this section.

Very respectfully,

DAVID HAUGHS,
Forest Nurseryman.

REPORT ON ARBOR DAY.

Honolulu, Nov. 11, 1912.

Hon. W. M. Giffard, President and Executive Officer, and Board of Agriculture and Forestry, Honolulu.

Gentlemen:—Herewith I submit a special report on Arbor Day for the year 1912.

Distribution of Trees.

The total number of trees distributed for Arbor Day planting amounted to 13,645 (13,145 pot grown and 500 in transplant boxes), divided as follows:

Public Schools.

Island	Number of schools	Number of trees
Oahu	13	383
Hawaii	7	236
Maui	14	479
Kauai	6	471
Molokai	4	339
Total	44	1908

General Public.

Applications for trees were received from 248 persons residing in and around Honolulu. To this number might be added 400 children from the public schools who called on Arbor Day and received one tree each.

The number of trees distributed amounted to 9,514. From the outside districts of the other islands, including Oahu, orders were received for 2,223 trees.

Summary.

	Trees
Public Schools	1,908
In and around Honolulu	9,514
Outside districts of other islands including Oahu	2,223
Total	13,645

The total number of trees distributed for Arbor Day, 1911, amounted to 11,508, making an increase of over 2000 trees for 1912.

The demand for flowering and shade trees has been much larger this year than for any preceding Arbor Day and our stock of those is almost exhausted. We have, however, a large number of forest and windbreak trees still in stock.

Very respectfully,

DAVID HAUGHS,
Forest Nurseryman.

ARTIFICIAL CROSS-FERTILIZATION OF THE MANGO.

BY A. J. BROOKS,
Assistant Agricultural Superintendent, St. Lucia.

(From the West Indian Bulletin.)

This work, as carried on at Dominica, is at present in its initial stages, but some benefit might be derived by placing on record the work that has so far been accomplished in the attempt to raise improved varieties of mangoes from seed.

There are numerous seedling mango trees to be found in most of the West Indian islands, the fruit of many being quite valueless from a commercial point of view, whilst others possess certain meritorious qualities which allow them to be described as second or third class fruits. Of first class fruits grown directly from seed few only are known to exist, and these have usually originated from plantations which have been confined in a great measure to one variety.

This variation, or failing to breed true, in seedling mangoes is due to indiscriminate cross-fertilization such as obtains in localities where numbers of different varieties are grown in close proximity, and where no attempt is made to protect the flowers from promiscuous cross-fertilization.

It is now generally acknowledged that by securing fertilization of a plant of one variety with pollen from a plant of a different variety, through cross-pollination, we obtain a variable race of which the individual plants may be expected to possess the inseparable characters of both parents in a varying degree.

The aim of this cross-fertilization was to combine the good qualities of two distinct varieties into a single variety, by securing a number of cross-fecundations between the two, and rearing plants from the seeds thus formed.

The first step in this direction was to make oneself intimately acquainted with the structure and functions of the flower. The flower of the mango, which is pale-yellow with a pinkish tinge, is very small, being only about 3 mm. in diameter. The flowers are borne on much-branched panicles and are very brittle; therefore great care and skill are necessary in their successful manipulation. There are five stamens, not all of which are fully developed and produce pollen.

In the variety chosen as the pollen parent in this instance, two of the five stamens produced pollen but only the pollen from the largest stamen proved to be fertile.

Ceylon No. 1—the variety chosen as the pollen parent—is of good appearance, a prolific bearer, and possesses excellent keeping qualities which should make it a valuable variety for shipping purposes, but it is of poor flavor. The variety chosen as the seed parent was the Julie. This variety is a free and regular bearer and possesses an excellent flavor—by some considered to be unsurpassed—but the fruit is too delicate to stand shipment.

In this particular case the main object sought was to endeavor to procure a variety bearing the keeping qualities of the pollen parent, combined with the excellent flavor of the seed parent.

Panicles bearing flowers of the pollen parent were enclosed in muslin bags. Before the flowers had time to open, to prevent foreign pollen becoming mixed with it, panicles of the seed parent were carefully selected in the most sheltered portions of the trees, and the number of flower buds on them reduced to about twenty. As soon as these were large enough to handle—this was usually found to be about one day previous to their opening naturally—they were opened and emasculated. In most cases the corolla was also cut away with a sharp pair of curved manicure scissors; this was found to give easier access to the stigma. Great skill and care were necessary in this operation, as the pedicels are extremely brittle and many flowers were lost in this way, some falling at once and others withering, no doubt because of injuries received during emasculation.

After emasculation, the panicles were at once enclosed in soft paper bags—1 lb. sugar bags being used for the purpose—the mouths of which were previously dipped in water to allow them to be drawn tightly round the base of the panicles and tied tightly with raffia to prevent the ingress of insects.

The stigma became receptive very shortly after the natural opening of the flower. This receptive condition of the stigma was indicated by its turning slightly darker than the style and appearing roughened on its surface; this can only be seen with the assistance of a strong lens.

A few ripe anthers were then chosen from Ceylon No. 1 and gently crushed on a watch glass. The pollen was then transferred to the stigma by a small scalpel made by hammering out the small end of a pin. This method was chosen in preference to the use of a camel-hair brush, as the amount of pollen obtainable in the case of the mango is very small and would possibly be lost in the hairs of the brush.

When the stigma had been successfully covered with the pollen the paper bags were quickly replaced. These were allowed to remain for several days, until the ovary commenced to swell; they were then removed and replaced by fine muslin bags. In all 145 flowers were operated upon as described. This extended over a period of two months.

On the ninth day from emasculation, the bags were removed in each case and the flowers examined. It was then found that the majority of them had been shed and only a total of twenty-four out of the 145 commenced to swell.

The swelling of the ovary is, I believe, commonly regarded as a sign that successful fertilization has taken place. In the present case, however, thirteen of these ovaries ceased to develop and finally withered after having doubled their normal size. This swelling was probably due to some irritation being caused by the growth of the pollen tubes.

Eleven fruits continued to develop, but unfortunately very strong winds set in and destroyed seven of the most promising when they were about half developed. With great care four fully developed fruits were obtained but only two were successfully germinated.

Complications due to polyembryony had been anticipated, but only a single seedling developed in each case.

Experiments are in progress, the results of which are hoped to further our knowledge in solving this problem of the polyembryony of the mango. In the absence of information to the contrary, it would have been assumed—had it been necessary—that the strongest of the seedlings was the "normal," believing it to have been the result of the fertilization of the egg-cell.

The two plants obtained have been planted out and are making good growth. When they have developed sufficiently, steps will be taken to induce early fruiting so that this work can be carried on to its final issue.

COTTON-GROWING IN ARGENTINA.

The information below is part of a report by H. M. Consul at Buenos Aires, reproduced in *The Board of Trade Journal* of September 5:

Cotton-growing in Argentina cannot be said to have emerged from its initial stage of development, but indications are not lacking of a possible flourishing and profitable industry in the future. Unfortunately Argentina does not possess the population needed for the development of her latent resources and is dependent upon immigration. The lack of labor is undoubtedly the most serious obstacle to the expansion of cotton-growing in the Republic. The only available local labor is supplied by a few native Indians and peasants from Paraguay and the Province of Corrientes. Apart from this difficulty cotton would seem to offer extensive possibilities, the vast districts of the Argentine lying to the north of the 32nd degree of south latitude being admirably adapted to its growth. The climate is particularly favorable to the cotton plant, the absence of rain at the critical ripening period conducing to the production of fibre of almost unrivalled quality. The greatest advantage of all is beyond doubt the total absence in Argentina of the much dreaded boll weevil, to the ravages of which is attributed the loss of a large part of the cotton yield of 1911 in the Mississippi valley alone. While this scourge is spreading throughout the entire cotton belt of the United States, causing millions of dollars of damage, the only parasite in Argentina detrimental to the cotton plant is a cotton worm that is easily exterminated by the use of Paris green.

The area under cultivation in the United States amounts to 30,000,000 acres and the same extent of territory is available for cotton-growing in Argentina. A Spanish syndicate in Barcelona has sent a commission of experts to Argentina to study the industry, more particularly from a labor standpoint, a fact that tends to show how seriously the problem is being grappled with, particularly when taken in conjunction with the large Spanish immigration into that country, amounting to 102,277 in 1911.

The future success of the industry would, of course, lie in cultivation for export, and the aim of the Barcelona syndicate would be to draw supplies of raw cotton from Argentina instead of the United States. At present cotton is being grown on a scale that falls a long way short of even satisfying the modest demands of the home market.

Out of about 6,200 acres at present under cultivation some 4,700 acres fall to the share of the Chaco territory. An expert comparison of the rich alluvial soil of this territory with that of the Mississippi valley leaves no room for doubting its productiveness. The principal centres of the cotton-growing industry are in the colonies of Resistencia, Benitez Margarita, Belen, Popular, Pastoril, Zapallar and General Vedia. A government experimental station has also been started in the Chaco territory to supply seed which will be distributed, on application, by the Ministry of Agriculture; the industry is at present exempt from taxation.

The Government have started agricultural colonies in the Chaco territory. These colonies may be occupied by settlers, who have a right to apply for a grant of land on payment of 2½ dollars per hectare (about 1s. 9d. per acre). This concession is offered to settlers who comply with the law. Applications should be made to the Land Office, Calle Tucuman 950, Buenos Aires, but the only way to secure the land appears to be by first settling thereon and then making application for a provisional lease. This lease is only granted provided the land is entirely free from any previous lien thereon.

The Government have also allotted a large tract of land, some 2,500,000 acres in extent, to be divided up into lots of 5,000 acres and sold by auction in Buenos Aires to the ighest bidder. The price of the land is payable in half-yearly instalments according to the decree at present in force.

This region will be traversed by a railway under construction from Barranqueras in the Chaco territory to Metan in Salta. As soon as the railhead reaches the 127th mile connection will be made with a branch line of the National Central Railway, thus establishing communication between the Northern provinces and the deep waterway of the Parana river, which will have a stimulating effect upon the industries of the district to be opened up.

The date of the sale by auction of the lands above referred to will be fixed as soon as the surveys of the new railway are complete, and will be announced at least three months before the sale takes place. The surveys will probably occupy a period of from three to six months.—*The Agricultural News.*

PROBLEMS OF ECONOMIC IMPORTANCE REGARDING PLANT DISEASES.

(*From the Agricultural News.*)

In his presidential address* to the British Mycological Society delivered in 1911, Professor Salmon states and illustrates, among others, four practical problems connected with certain aspects of the life-histories of economic fungi. Although these problems were all considered and illustrated with reference to economic mycology in England, yet in themselves they are equally important in connection with plant pathology in the tropics. Stated shortly they are as follows:

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* **Transactions of the British Mycological Society, 1911.**

"What is the economic importance of that specialization of parasitism now proved to exist in many fungi?

"What degree of importance, from the economic point of view, is to be attributed to the *saprophytic* stage in the life-history of any fungus causing a plant disease?

"What are the conditions under which some saprophytic species of fungi become parasites?

"What are the conditions under which a parasitic fungus attacks a new host species?"

Some few words of explanation are necessary to elucidate the subject involved in the first problem. It has been shown by inoculations, notably among members of the rust family (Uredineae) and of the family of powdery mildews (Erysiphaceae), that of a fungus species occurring on a large number of host species one form on a host species *a* cannot attack a host species *b*, and vice versa. Thus although the two forms of fungus cannot be distinguished from one another by their morphological characters, that is by those characters that together may be said to make up their general appearance, yet biologically they are different in that their powers of parasitism are very strictly limited. The economic aspect of this is that if the host species *a* and *b* are growing together and only the biological form of fungus parasitic on *a* is present, then the species *b* will appear immune. But if the fungus strain parasitic on *b* is also present or is introduced, *b* also will be attacked or its immunity will appear to break down. There is, moreover, another means whereby *b* might become attacked from *a*. It has been found in some cases that the fungus parasitic on *a* can attack a third species *x* and that when it has grown on *x* for one or more generations, spores from *x* can infect *b*. Thus *x* serves as a bridging species to carry the fungus from *a* to *b*, and the introduction of *x* into a cultivation where *a* is attacked and *b* is immune would naturally result in the breaking down of *b*'s immunity. Finally, it has also been shown that the immunity of the species *b* to the fungus strain on *a* may be partly broken down, if the parts of *b* liable to attack are damaged by adverse conditions, wounds, or the depredations of insects.

Very little, if anything, is known of the existence of biological species in the tropics; yet the matter is clearly worthy of attention, particularly in relation to the production or introduction of immune varieties of host plants and in considering legislation restricting the introduction of plants from one country into another. These applications are so evident that they do not call for further elaboration here. In conclusion it may be added that the related genera Colletotrichum and Gloeosporium, to mention only two, might well repay investigation from this point of view.

The next point raised by Professor Salmon is that of the degree of importance, from the economic point of view, of the saprophytic stage of a fungus causing a plant disease. It has been found that the mycelium producing conidial fructifications of a fungus may live as a parasite, while that producing the ascigerous fruit lives as a saprophyte on dead and often fallen portions of the same plant. In countries with a very marked change of climate in summer and winter this power may be of considerable economic value, since the saprophytic stage may serve to carry the fungus through the winter and give rise to new outbreaks of disease in the succeeding spring. In mild winters the parasitic stage may persist, but under extreme conditions the saprophytic form may alone be able to survive. An investigation of this problem is of more importance in temperate countries than in the more uniform climatic conditions of the tropics, yet even there it should hardly be entirely neglected. It is possible, for example, that definite knowledge of the part played in spreading infection by the ascospores of *Rosellinia bunodes,* the black root disease fungus, would be of value. The perithecia in this instance always develop on a saprophytic mycelium, some time after the tree is dead. Their growth is slow and the spores have a thick outer coat—all facts which point to this stage as intended to carry the fungus through unfavorable conditions. It would appear, however, that most fungi perpetuate themselves in the tropics largely by means of conidia, since the ascigerous stage is often either entirely absent or only rarely formed.

The question of the conditions under which some saprophytic species of fungi become parasites is one of very great importance in the tropics, and one on which some information, of a rather preliminary nature, has been obtained. Quite a large number of the more serious diseases of crops are caused by fungi that are far more usually saprophytic than parasitic in habit. As an example may be taken the ubiquitous *Thyridaria tarda* found as a saprophyte on an immense number of different plants, and as a wound parasite on cacao, Hevea and tea, among other hosts. Its parasitism is largely dependent on conditions unfavorable to the growth of the host, as well as on other factors. Again, the root disease of Para rubber in the East is due to a fungus (*Fomes semitostus*) usually saprophytic on forest stumps. Its parasitism depends on the presence of large quantities of decaying wood which afford it food for vigorous vegetative development before it begins its attack, and on the presence of an ample supply of moisture. The same is probably true to some extent of *Rosellinia bunodes* referred to above. The solution of the problem in connection with many species of the family of bracket fungi (Polyporaceae), to which *Fomes semitostus* belongs, is a matter of some importance in the tropics, as many of them appear to act occasionally as wound parasites or as root parasites on trees planted in newly cleared forest land. Similar investigations would be valuable in the case of many of the toadstools (Agaricaceae) and of the genera Colletotrichum and Gloeosporium, of which many forms are found on ripe or fallen fruits.

Of the last of Professor Salmon's questions, namely, what are the conditions under which a parasitic fungus attacks a new host species, nothing appears to be known in the tropics, since the records as a rule do not go back far enough to show that when a parasitic fungus is found on an apparently new host plant, it has never actually occurred on that host before in the same locality, or in some other. This again is a problem worthy of attention.

Other problems of some economic importance also occur in connection with the life-histories of fungi, besides those mentioned by Professor Salmon. One is: to what extent a strain of a parasitic fungus may lose its virulence when growing for some time on the same host plant in a limited area, exhibiting fairly uniform conditions of climate. Another is: to what extent do strains showing very marked differences in virulence occur in one species of parasitic fungus. While yet another is: to what extent do certain species of partly parasitic fungi, such as *Thyridaria tarda,* found throughout the tropics on several host plants and originally probably pure saprophytes, exhibit before our eyes a process of developing parasitism, becoming at the same time specialized to the host plant predominating in any given locality. So many partly parasitic fungi are of universal distribution in the tropics, and are capable of attacking several host plants, that it seems very possible that some of them may actually afford instances of the progress and specialization of parasitism.

The investigation of problems of the nature of those just considered belongs in a sense to the realm of pure research, and requires more time than is usually available to the plant pathologist engaged in pioneer or routine work. In fact such investigation bears much the same relation to routine plant pathology that medical research does to the work of a general practitioner. The future may prove that the parallel can be carried farther, and that the solution of these problems is as important to the economic welfare of an agricultural community as the results of medical research are to its bodily health.

A SUGAR-CANE PEST IN ST. CROIX.

Dr. Longfield Smith, Ph. D., Director of Agriculture, St. Croix, Danish West Indies, in correspondence with the Imperial Commissioner of Agriculture, has given a brief account of an insect which occurs in that island' as a pest of sugar-cane.

The insect is a large, brown beetle, the name of which Dr. Smith gives as *Strategus titanus;* it belongs to the same family as the common hardback (*Ligyrus tumulosus*). The larva of *Strategus titanus* is in shape and general appearance similar to the typical larvae of insects in this group, but it is much larger than the common hardback larva, attaining a length of over 2 inches, while it is about one-half inch in thickness.

The insects of this group, Dynastides, are more often scavengers, feeding on decaying organic matter, than actual pests feeding on the living tissues of plants of economic importance. When, however, they do occur as pests the injury to plants is usually the result of the feeding of the grubs on the fine roots after the manner of the related insects of the Melolonthid group, of which the brown hardback (*Phytalus smithi*) and the May beetles (*Lachnosterna patens* in St. Vincent and *L. patruelis* in St. Kitts) are examples. In the case of the sugar-cane beetle (*Ligyrus rugiceps*) of the United States, however, the injury is reported to be due to the adults tunnelling into the base of the stem. The injury to canes in St. Croix by *Strategus titanus* is different from both these. The habits of this insect are stated by Dr. Smith to be as follows: "It occurs very abundantly, much to our disadvantage. It (the larva) eats the roots of canes, sweet potatoes and other plants and burrows into the bases of the cane shoots, eating its way upward, and turning the cane into a hollow tube. The insect is saprophytic as well as parasitic. I have found it living in decaying megass heaps. At present (September 18) the grubs do not seem to be so abundant as they were, probably because many have turned to beetles, which are now busy laying eggs."

There would seem to be no doubt that *Strategus titanus* is capable of becoming a very serious pest, and it is obvious that every effort should be made to prevent the introduction of this insect into any colony where it does not at present exist.—*The Agricultural News.*

ROBUSTA COFFEE.

Testimony seems to be abundant that *Caffea Robusta* is a money producer that should receive a larger attention in Mindanao. It is a rapid, thrifty grower, an early producer, doing best under rich, alluvial, well-drained soils, thrives from sea-level up to 3000 feet altitude and does best with shade when young. Planted at corners of 12-foot squares with an additional plant in the centre, the yields, in the second year from planting, are 150 pounds of coffee per acre, and increasing annually to 2100 to 2400 pounds per acre at six years.

The tree is much freer from diseases and pests than other varieties of coffee, the fruit shells easily and is borne in thick bunches giving facility in gathering. No expensive machinery is required in the treatment of the berry. The quality is that of medium Arabian and sells at about 10% below good Java; but the ease of production more than offsets the difference in market value.

Caffea Robusta should make a good intercrop with cocoanuts and rubber. It should be planted not nearer than seven feet from rubber and a greater distance from cocoanuts.

When planted with rubber the latter would shade the coffee out in about 5 years but in the meantime the coffee pays a good dividend while the rubber is maturing. With cocoanuts planted 30 by 30 feet the intercrop coffee should continue yielding much longer, particularly if planted six feet apart in rows running East and West so as to secure a maximum of light.

The evenly distributed rainfall, favorable to rubber and cocoanuts, suits the Robusta coffee the best.

This variety has made most excellent growth and yield in Basilan and would no doubt do well all over Mindanao where droughts are not pronounced and where volcanic soil rich in vegetable matter prevails.—*Mindanao (P. I.) Herald.*

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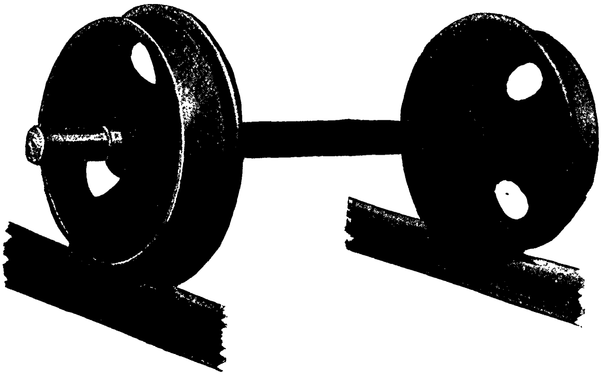

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A. R. Glaisyer, *Deputy Territorial Veterinarian for Kauai.*

CLERICAL STAFF

Mrs. A. Oram, *Secretary to the Board and Librarian.*
Mrs. C. L. Seybolt, *Clerk.*
Daniel Logan, *Editor of the "Forester."*

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 207, Honolulu.

BOARD.

Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
*** First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.**
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
Report of the Board of Commissioners of Agriculture and Forestry, for the biennial period ending December 31, 1910; 240 pp.; 45 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits Vegetables etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.

PUBLICATIONS FOR DISTRIBUTION—Continued.

"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.

"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.

"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VII; 1904-1910. To be obtained from the Hawaiian Gazette Co., Honolulu. Price $1 a year.

DIVISION OF FORESTRY.

* "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.

* "Suggestions in Regard to the Arbor Day Tree Planting Contests." Press Bulletin No. 2; 7 pp.; 1905.

"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.

"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.

* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.

"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.

"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.

"Eucalyptus Culture in Hawaii," by Louis Margolin. Bulletin No. 1; 88 pp.; 12 plates; 1911.

Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.

* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.

Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.

Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

Report of the Division of Forestry, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 86 pp.; 22 plates.

DIVISION ON ENTOMOLOGY.

"The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.

** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.

* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.

*"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.

"The Japanese Beetle Fungus," by Jacob Kotinsky and Bro. M. Newell. Circular No. 2; 4 pp., cut; 1905.

Rule VII: "Concerning the Prevention of Distribution of the Mediterranean Fruit Fly"; unnumbered leaflet; 1910.

Rule VIII: "Concerning the Importation of all Banana Fruit, Banana Shoots or Plants"; unnumbered leaflet; 1911.

Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.

Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.

Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.

Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board: 26 pp.; 2 plates.

Report of the Division of Entomology, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 70 pp.; 10 plates.

DIVISION OF ANIMAL INDUSTRY.

* "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.

* "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.

* "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.

* "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.

* "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.

"Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; unnumbered pamphlet; Revised 1910.

Report of the Division of Animal Industry, for the year ending December 31, 1905 Reprint from Second Report of the Board; 62 pp.

Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.

Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.

Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.

Report of the Division of Animal Industry, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 59 pp.; 13 plates.

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* Out of print.